Quick setup guide

TDR sensor for continuous level and interface measurement of liquids

VEGAFLEX 81

4 … 20 mA/HART two-wire

Coax probe

With SIL qualification

Document ID: 47584

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Information:
This quick setup guide enables a quick setup of your instrument.

You can find further information in the corresponding, comprehensive operating instructions. This manual is available on the supplied DVD or in the download area under "*www.vega.com*".

Operating instructions VEGAFLEX 81 - 4 … 20 mA/HART - Two-wire - Coax probe - With SIL qualifikation: Document-ID 44216
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1 For your safety

1.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

During work on and with the device the required personal protective equipment must always be worn.

1.2 Appropriate use

VEGAFLEX 81 is a sensor for continuous level measurement.

You can find detailed information about the area of application in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

1.3 Warning about incorrect use

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

1.4 General safety instructions

This is a state-of-the-art instrument complying with all prevailing regulations and guidelines. The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for the trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

The safety instructions in this operating instructions manual, the national installation standards as well as the valid safety regulations and accident prevention rules must be observed by the user.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden.

The safety approval markings and safety tips on the device must also be observed.

1.5 CE conformity

The device fulfills the legal requirements of the applicable EC guidelines. By affixing the CE marking, we confirm successful testing of the product.

You can find the CE Certificate of Conformity in the download section of our homepage.

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Electromagnetic compatibility
Instruments in four-wire or Ex-d-ia version are designed for use in an industrial environment. Nevertheless, electromagnetic interference from electrical conductors and radiated emissions must be taken into account, as is usual with class A instruments according to EN 61326-1. If the instrument is used in a different environment, the electromagnetic compatibility to other instruments must be ensured by suitable measures.

1.6 SIL qualification according to IEC 61508

The instrument meets the specifications of IEC 61508: 2010 (Edition 2). It is qualified for single-channel operation up to SIL2. The instrument can be used homogeneously redudant up to SIL3 in multichannel architecture with HFT 1.

1.7 NAMUR recommendations

NAMUR is the automation technology user association in the process industry in Germany. The published NAMUR recommendations are accepted as the standard in field instrumentation.

The device fulfills the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 43 – Signal level for malfunction information from measuring transducers
- NE 53 – Compatibility of field devices and display/adjustment components
- NE 107 – Self-monitoring and diagnosis of field devices

For further information see www.namur.de.

1.8 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfill this obligation by observing the environmental instructions in this manual:

- Chapter "*Packaging, transport and storage*"
- Chapter "*Disposal*"

2 Product description

2.1 Configuration

Type label

The type label contains the most important data for identification and use of the instrument:

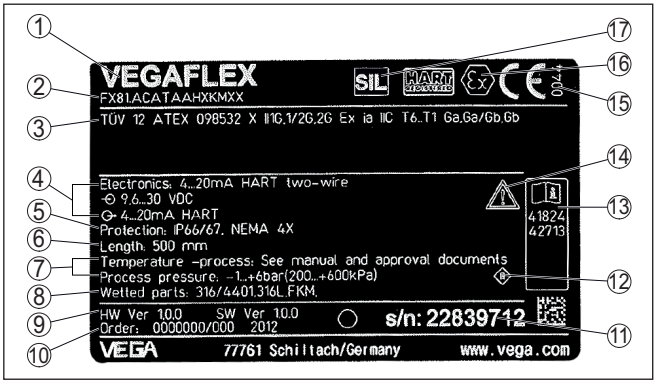

Fig. 1: Layout of the type label (example)

1 *Instrument type*
2 *Product code*
3 *Approvals*
4 *Power supply and signal output, electronics*
5 *Protection rating*
6 *Probe length*
7 *Process and ambient temperature, process pressure*
8 *Material, wetted parts*
9 *Hardware and software version*
10 *Order number*
11 *Serial number of the instrument*
12 *Symbol of the device protection class*
13 *ID numbers, instrument documentation*
14 *Reminder to observe the instrument documentation*
15 *Notified authority for CE marking*
16 *Approval directives*
17 *Marking of the safety function in SIS*

Serial number - Instrument search

The type label contains the serial number of the instrument. With it you can find the following instrument data on our homepage:

- Product code (HTML)
- Delivery date (HTML)
- Order-specific instrument features (HTML)
- Operating instructions and quick setup guide at the time of shipment (PDF)
- Order-specific sensor data for an electronics exchange (XML)
- Test certificate (PDF) - optional

Go to www.vega.com, "*VEGA Tools*" and "*Instrument search*". Enter the serial number.

Alternatively, you can access the data via your smartphone:

- Download the smartphone app "*VEGA Tools*" from the "*Apple App Store*" or the "*Google Play Store*"
- Scan the Data Matrix code on the type label of the instrument or
- Enter the serial number manually in the app

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3 Mounting

3.1 General instructions for use of the instrument

Protection against moisture

Protect your instrument against moisture penetration through the following measures:

- Use the recommended cable (see chapter "*Connecting to power supply*")
- Tighten the cable gland
- Turn the housing in such a way that the cable gland points downward
- Loop the connection cable downward in front of the cable gland

This applies particularly to:

- Outdoor mounting
- Installations in areas where high humidity is expected (e.g. through cleaning processes)
- Installations on cooled or heated vessels

3.2 Mounting instructions

Installation position

During operation, the probe must not touch any installations or the vessel wall. If necessary, fasten the probe end.

In vessels with conical bottom it can be advantageous to mount the sensor in the center of the vessel, as measurement is then possible nearly down to the lowest point of the bottom. Keep in mind that measurement all the way down to the tip of the probe may not be possible. The exact value of the min. distance (lower dead band) is stated in chapter "*Technical data*".

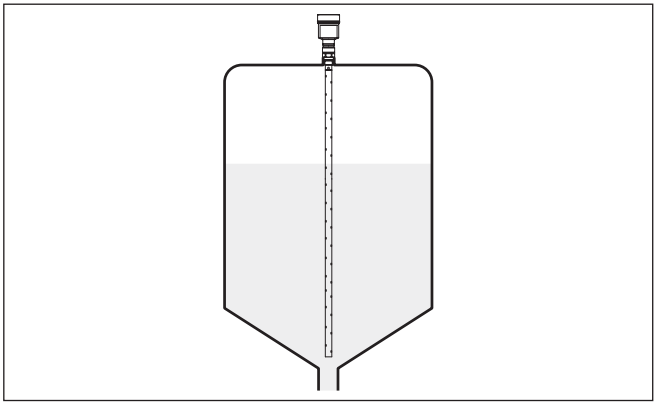


Fig. 2: Vessel with conical bottom

4 Connecting to power supply

4.1 Connecting

Connection technology

The voltage supply and signal output are connected via the spring-loaded terminals in the housing.

Connection to the display and adjustment module or to the interface adapter is carried out via contact pins in the housing.

Information:
The terminal block is pluggable and can be removed from the electronics. To do this, lift the terminal block with a small screwdriver and pull it out. When reinserting the terminal block, you should hear it snap in.

Connection procedure

Proceed as follows:

1. Unscrew the housing cover
2. If a display and adjustment module is installed, remove it by turning it slightly to the left.
3. Loosen compression nut of the cable entry gland
4. Remove approx. 10 cm (4 in) of the cable mantle, strip approx. 1 cm (0.4 in) of insulation from the ends of the individual wires
5. Insert the cable into the sensor through the cable entry

Fig. 3: Connection steps 5 and 6 - Single chamber housing

Fig. 4: Connection steps 5 and 6 - Double chamber housing

6. Insert the wire ends into the terminals according to the wiring plan

Information:
Solid cores as well as flexible cores with wire end sleeves are inserted directly into the terminal openings. In case of flexible cores without end sleeves, press the terminal from above with a small screwdriver, the terminal opening is then free. When the screwdriver is released, the terminal closes again.

You can find further information on the max. wire cross-section under "*Technical data/Electromechanical data*"

7. Check the hold of the wires in the terminals by lightly pulling on them
8. Connect the screen to the internal ground terminal, connect the outer ground terminal to potential equalisation
9. Tighten the compression nut of the cable entry gland. The seal ring must completely encircle the cable
10. Reinsert the display and adjustment module, if one was installed
11. Screw the housing cover back on

The electrical connection is finished.

4.2 Wiring plan, single chamber housing

The following illustration applies to the non-Ex, Ex-ia and Ex-d version.

Electronics and terminal compartment

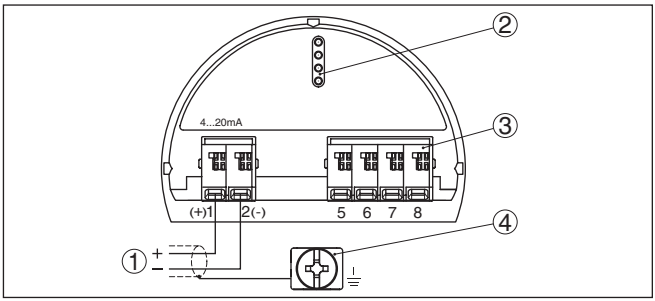


Fig. 5: Electronics and terminal compartment, single chamber housing

1 Voltage supply, signal output
2 For display and adjustment module or interface adapter
3 For external display and adjustment unit
4 Ground terminal for connection of the cable screen

4.3 Wiring plan, double chamber housing

The following illustrations apply to the non-Ex as well as to the Ex-ia version.

Terminal compartment

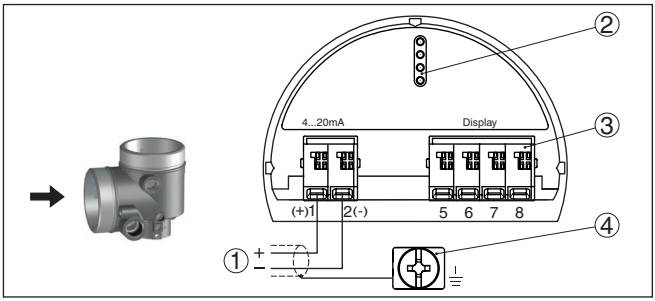


Fig. 6: Terminal compartment, double chamber housing

1 Voltage supply, signal output
2 For display and adjustment module or interface adapter
3 For external display and adjustment unit
4 Ground terminal for connection of the cable screen

Information:
The use of an external display and adjustment unit and a display and adjustment module in parallel in the connection compartment is not supported.

5 Set up with the display and adjustment module

5.1 Insert display and adjustment module

The display and adjustment module can be inserted into the sensor and removed again at any time. You can choose any one of four different positions - each displaced by 90°. It is not necessary to interrupt the power supply.

Proceed as follows:

1. Unscrew the housing cover
2. Place the display and adjustment module in the requested position onto the electronics and turn to the right until it snaps in
3. Screw housing cover with inspection window tightly back on

Removal is carried out in reverse order.

The display and adjustment module is powered by the sensor, an additional connection is not necessary.

Fig. 7: Installing the display and adjustment module in the electronics compartment of the single chamber housing

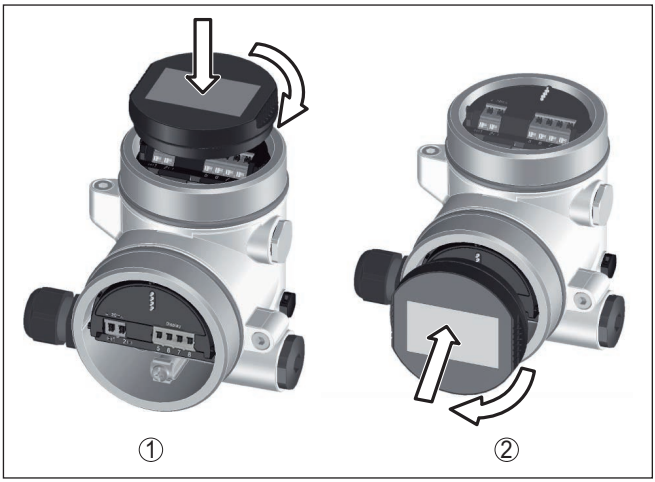


Fig. 8: Insertion of the display and adjustment module into the double chamber housing

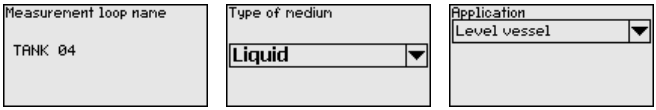
1 In the electronics compartment
2 In the connection compartment (with Ex-d-ia version not possible)

Note:
If you intend to retrofit the instrument with a display and adjustment module for continuous measured value indication, a higher cover with an inspection glass is required.

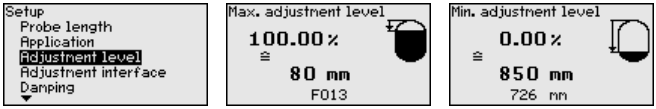
5.2 Parameter adjustment

Set parameters

1. In this menu item you can select the application. You can choose between level and interface measurement.



2. In the menu item "*Medium - Dielectric constant*" you can define the type of medium (medium).
3. Carry out the adjustment in the menu items "*Min. adjustment*" and "*Max. adjustment*".



4. A "*Linearization*" is recommended for all vessels in which the vessel volume does not increase linearly with the level - e.g. in a horizontal cylindrical or spherical tank. Activate the appropriate curve.
5. A "*False signal suppression*" detects, marks and saves the false signals so that they are no longer taken into account for level

measurement. We generally recommend a false signal suppression.

Parameterization example

The sensor measures the distance from the sensor (reference plane) to the product surface.

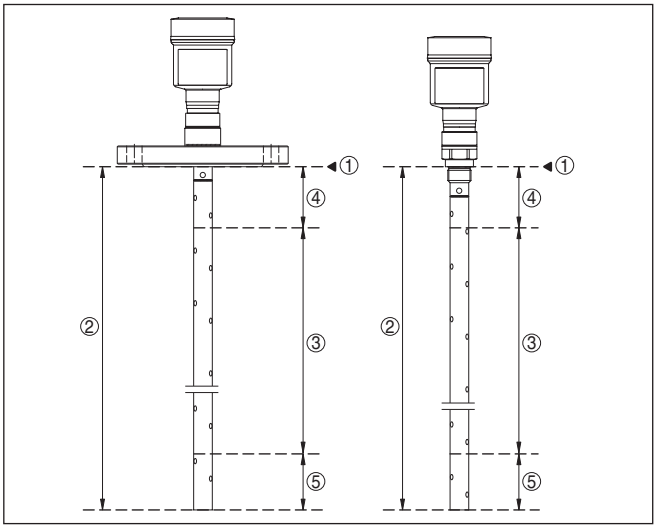


Fig. 9: Measuring ranges - VEGAFLEX 81

1 Reference plane
2 Probe length L
3 Measuring range (default setting refers to the measuring range in water)
4 Upper dead band (in this area no measurement is possible)
5 Lower dead band (in this area no measurement is possible)

For this adjustment, the distance is entered when the vessel is full and nearly empty. If these values are not known, an adjustment with other distances, for example, 10 % and 90 % is also possible. Starting point for these distance specifications is always the seal surface of the thread or flange.

Further steps

1. In the menu "*Additional settings*", menu item "*Damping*" you can adjust the requested damping of the output signal.
2. Select the parameter of the current output and the output characteristics in the menu item "*Current output*".

6 Supplement

6.1 Technical data

Electromechanical data - version IP 66/IP 67 and IP 66/IP 68; 0.2 bar	
Cable gland	M20 x 1.5 or ½ NPT
Wire cross-section (spring-loaded terminals)	
– Massive wire, cord	0.2 … 2.5 mm² (AWG 24 … 14)
– Stranded wire with end sleeve	0.2 … 1.5 mm² (AWG 24 … 16)

Voltage supply	
Operating voltage	
– Non-Ex instrument, Ex-d instrument	9.6 … 35 V DC
– Ex-ia instrument	9.6 … 30 V DC
– Ex-d-ia instrument	15 … 35 V DC
Operating voltage with illuminated display and adjustment module	
– Non-Ex instrument, Ex-d instrument	16 … 35 V DC
– Ex-ia instrument	16 … 30 V DC
– Ex-d-ia instrument	20 … 35 V DC
Interpolation protection	Integrated
Permissible residual ripple - Non-Ex, Ex-ia instrument	
– Frequency	16 … 400 Hz
– for 12 V< U_N < 18 V	≤ 0.7 V_{eff}
– for 18 V< U_N < 35 V	≤ 1.0 V_{eff}
Permissible residual ripple - Ex-d-ia instrument	
– Frequency	16 … 400 Hz
– for 18 V< U_N < 35 V	≤ 1.0 V_{eff}
Load resistor	
– Calculation	(U_B - U_{min})/0.0215 A
– Example - Non-Ex instrument with U_B= 24 V DC	(24 V - 9.6 V)/0.0215 A = 670 Ω

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Printing date:

All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.
Subject to change without prior notice

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